

Amendments to the Claims:

Following is a complete listing of the claims pending in the application, as amended, which replaces all prior versions and listings of claims in the application:

1-7. (Canceled.)

8. (Original) A method in a computer for providing information about a current state that is modeled with multiple attributes, the method comprising:

receiving from a first source an indication of an ability to supply values for an indicated one of the state attributes of the modeled current state;

after receiving an indication from a client for a value of the one attribute, supplying to the client a value for the one attribute received from the first source;

after the supplying of the value received from the first source, receiving from a second source an indication of an ability to supply values for the one attribute;

after receiving an indication from the client for a value of the one attribute, supplying to the client a value for the one attribute based on values received for the one attribute from the first and second sources;

after the supplying of the value based on the values received for the one attribute from the first and second sources, receiving from the first source an indication of an inability to supply values for the one attribute; and

after receiving an indication from the client for a value of the one attribute, supplying to the client a value for the one attribute received from the second source.

9. (Original) The method of claim 8 wherein the receiving of a value for the one attribute from the first source includes receiving descriptive information about the received value.

10. (Original) The method of claim 9 wherein the descriptive information includes a time at which the received value is most accurate.

11. (Original) The method of claim 9 wherein the descriptive information includes a confidence factor indicating a likelihood of accuracy of the received value.

12. (Original) The method of claim 9 including supplying the descriptive information about the received value to the client.

13. (Original) The method of claim 8 wherein the supplying of a value for the one attribute to the client includes supplying an indication of the source from which the supplied value was received.

14. (Original) The method of claim 8 wherein a received indication from the client for the value of the one attribute additionally include an indication of a source for the value, and wherein the value of the one attribute that is supplied to the client in response is received from the indicated source.

15. (Original) The method of claim 8 wherein the supplied value based on the values received from the first and second sources is a mediated value.

16. (Original) The method of claim 8 including, before supplying a value to the client: determining whether the value to be supplied satisfies a criteria indicated for the requested value; and

when it is determined that the value does not satisfy the indicated criteria,

requesting at least one of the first and second sources to supply a value for the one attribute that satisfies the indicated criteria;

receiving in response to the requesting at least one additional value for the one attribute that satisfies the indicated criteria; and

supplying to the client a value for the one attribute based on the received additional values.

17. (Original) The method of claim 8 including storing values for attributes that are received from sources so that the stored values can be later supplied to clients.

18. (Original) The method of claim 8 wherein the one attribute represents information about a user of the computer.

19. (Original) The method of claim 18 wherein the information about the user of the computer indicates a modeled mental state of the user.

20. (Original) The method of claim 8 wherein the one attribute represents information about the computer.

21. (Original) The method of claim 8 wherein the one attribute represents information about a physical environment of a user of the computer.

22. (Original) The method of claim 8 wherein the one attribute represents information about a cyber-environment of a user of the computer.

23. (Original) The method of claim 8 including:
after the supplying of the value that is received from the second source,
receiving from the second source an indication of an inability to supply values for the one attribute; and
after receiving an indication from the client for a value of the one attribute, indicating to the client that the value of the one attribute is not currently available.

24. (Original) The method of claim 8 including:
after the supplying of the value that is received from the second source,
receiving from the second source an indication of an inability to supply values for the one attribute; and
after receiving an indication from the client for a value of the one attribute,
identifying a criteria that a value to be supplied to the client is to satisfy;
determining that a value of the one attribute which satisfies the identified criteria is not available; and

supplying to the client a value of the one attribute which does not satisfy the identified criteria.

25. (Original) The method of claim 8 including:
after the supplying of the value that is received from the second source,
receiving from the second source an indication of an inability to supply values for the one attribute; and
after receiving an indication from the client for a value of the one attribute,
generating a value of the one attribute; and
supplying to the client the generated value.

26. (Original) The method of claim 8 including, after receiving an indication from the client for a value of a second indicated attribute, supplying to the client a value for the second attribute.

27. (Original) The method of claim 26 wherein the supplied value for the second attribute is received from the first source.

28. (Original) The method of claim 8 including, after receiving an indication from a second client for a value of an attribute, supplying to the second client a value for the attribute.

29. (Original) The method of claim 28 wherein the attribute whose value is indicated by the second client is the one attribute.

30. (Original) The method of claim 8 wherein the providing of the information about the modeled current state is performed by a first intermediary module, and including:

receiving from a second intermediary module an indication of a desire to perform the providing of the information about the modeled current state; and

in response to the received indication from the second intermediary module, permitting the second intermediary module to perform future providing of the information about the modeled current state.

31. (Original) The method of claim 30 wherein the permitting includes supplying to the second intermediary module an indication of each source which is currently indicated to have an ability to supply values for at least one of the state attributes, so that the second intermediary module can receive future indications of abilities and inabilities to supply values for state attributes from sources.

32. (Original) The method of claim 31 including:
before the receiving of the indication from the second intermediary module, receiving from each of multiple clients an indication of a desire to receive at least one value for a specified state attribute; and

in response to the received indication from the second intermediary module, supplying to the second intermediary module an indication of each client from whom an indication of a desire to receive at least one value for a specified state attribute has been received, so that the second intermediary module can receive future indications of desires to receive values for state attributes from clients.

33. (Original) The method of claim 31 including, under control of the second intermediary module, receiving the supplied indications of the sources which are currently indicated to have an ability to supply values for at least one of the state attributes and notifying the indicated sources to supply the future indications to the second intermediary module.

34. (Original) The method of claim 30 wherein the permitting includes notifying each source which is currently indicated to have an ability to supply values for at least one of the state attributes to supply future indications of abilities and inabilities to supply values for state attributes to the second intermediary module.

35. (Original) The method of claim 30 including:
before the receiving of the indication from the second intermediary module, receiving from each of multiple clients an indication of a desire to receive at least one value for a specified state attribute; and

in response to the received indication from the second intermediary module, notifying each client from whom an indication of a desire to receive at least one value for a specified state attribute has been received to supply future indications of desires to receive values for state attributes to the second intermediary module.

36. (Original) The method of claim 8 wherein the received indications from the first and second sources of the ability to supply values for the one attribute are registration messages.

37. (Original) The method of claim 36 wherein each of the received indications from the client for the value of the one attribute are requests, and including receiving from the client a registration message before receiving any of the requests, the registration message indicating an interest of the client in receiving values for the one attribute.

38. (Original) The method of claim 8 wherein security information for a source must be received before any values of state attributes are received from the source.

39. (Original) The method of claim 8 wherein security information for a client must be received before any values of state attributes are supplied to the client.

40. (Original) The method of claim 8 wherein the indications from the client for the value of the one attribute are based on an indication of a desire to receive values for the one attribute that is received before the receiving of the indications of ability and inability to supply values from the first and second sources, and wherein the supplying of the values to the client is in response to receiving of values for the one attribute from the first or second sources.

41. (Original) The method of claim 8 wherein the received indications from the client for the value of the one attribute are requests received from the client, and wherein the supplying of the values to the clients are in response to the receiving of the requests.

42. (Original) The method of claim 41 including:

sending requests to the first or second sources for a value of the one attribute in response to the receiving of the requests from the clients; and

receiving values for the one attribute from the first or second sources in response to the sent requests.

43. (Original) The method of claim 8 wherein the first source is at a location remote from the computer, and wherein the indications from the first source of the ability and the inability to supply values for the one attribute are received based on proximity of the computer to the location of the first source.

44. (Original) The method of claim 8 wherein the first source is software executing on the computer, and wherein the indications from the first source of the ability and the inability to supply values for the one attribute are received based on availability of input information to the first source.

45. (Original) The method of claim 8 wherein the providing of the information about the modeled current state is performed by an operating system of the computer.

46. (Original) The method of claim 8 wherein the providing of the information about the modeled current state is performed by a software module, and including, upon commencement of execution of the software module, commencing execution of multiple sources that are each to supply values for at least one of the state attributes.

47. (Original) The method of claim 46 wherein the multiple sources that are to be executed are determined based on previous received indications of ability to supply values for at least one state attribute.

48. (Original) The method of claim 8 wherein the state attributes are part of a predefined taxonomy of attributes.

49. (Original) The method of claim 8 wherein the state attributes are dynamically defined by sources who indicate an ability to supply values for the defined attributes.

50. (Original) The method of claim 8 including receiving from the client an indication of another state attribute and an indication that a source for a value for the indicated another state attribute is to be a same source as for the supplied value for the one attribute, and selecting a value to be sent to the client for the another state attribute that is received from the same source.

51. (Original) The method of claim 8 including receiving from the first source an indication of a group of at least one authorized client, and wherein a value received from the first source is supplied to the client only if the client is one of the authorized clients.

52. (Original) The method of claim 8 wherein the first source includes a group of instructions to be executed to produce a value for the one attribute, and including loading and executing the group of instructions in response to the receiving of the indication from the client for a value of the one attribute, the loading and executing so that the first source can produce the first value.

53. (Original) The method of claim 8 wherein receiving of the supplied value by the client prompts the client to present information to a user of the client.

54. (Currently Amended) A computer-readable medium whose contents cause a computing device to provide information about a current state that is modeled with multiple attributes, by performing a method comprising:

receiving from a first source an indication of an ability to supply values for an indicated one of the state attributes of the modeled current state;

after receiving an indication from a client for a value of the one attribute, supplying to the client a value for the one attribute received from the first source;

receiving from a second source an indication of an ability to supply values for the one attribute;

after receiving an indication from the client for a value of the one attribute, supplying to the client a value for the one attribute based on values received for the one attribute from the first and second sources;

receiving from the first source an indication of an inability to supply values for the one attribute; and

after receiving an indication from the client for a value of the one attribute, supplying to the client a value for the one attribute received from the second source.

55. (Original) The computer-readable medium of claim 54 wherein the computer-readable medium is a memory of the computing device.

56. (Currently Amended) A computer-readable generated data signal transmitted via a transmission medium, the generated data signal having encoded contents that cause a computer system to provide information about a current state that is modeled with multiple attributes, by performing a method comprising:

receiving from a first source an indication of an ability to supply values for an indicated one of the state attributes of the modeled current state;

after receiving an indication from a client for a value of the one attribute, supplying to the client a value for the one attribute received from the first source;

receiving from a second source an indication of an ability to supply values for the one attribute;

after receiving an indication from the client for a value of the one attribute, supplying to the client a value for the one attribute based on values received for the one attribute from the first and second sources;

receiving from the first source an indication of an inability to supply values for the one attribute; and

after receiving an indication from the client for a value of the one attribute, supplying to the client a value for the one attribute received from the second source.

57. (Original) A computing device for providing information about a current state that is represented with multiple attributes, comprising:

an attribute mapping module that is capable of receiving from each of a first source and a second source an indication of an ability to supply values for an indicated one of the attributes of the current state, and that is capable of later receiving from the first source an indication of an inability to supply values for the one attribute;

an attribute value receiver module that is capable of receiving values for the one attribute from the first and second sources; and

an attribute value supplier module that is capable of,
after the indication is received from the first source of the ability to supply values for the one attribute and before the indication is received from the second source, supplying to a client a value for the one attribute received from the first source,
after the indications are received from the first and second sources, supplying to the client a value for the one attribute based on values received for the one attribute from the first and second source; and

after the indication is received from the second source and after the indication is received from the first source of the inability to supply values for the one attribute, supplying to a client a value for the one attribute received from the second source.

58. (Original) The computing device of claim 57 wherein the attribute mapping module, the attribute value receiver module, and the attribute value supplier module are components of an intermediary module executing in memory, and further comprising multiple sources and multiple clients executing in the memory.

59. (Original) A computing device for providing information about a current state that is represented with multiple modeled attributes, comprising:

means for receiving from a first source an indication of an ability to supply values for an indicated one of the modeled attributes of the current state;

means for, after receiving an indication from a client for a value of the one attribute, supplying to the client a value for the one attribute received from the first source;

means for receiving from a second source an indication of an ability to supply values for the one attribute;

means for, after receiving an indication from the client for a value of the one attribute, supplying to the client a value for the one attribute based on values received for the one attribute from the first and second sources;

means for receiving from the first source an indication of an inability to supply values for the one attribute; and

means for, after receiving an indication from the client for a value of the one attribute, supplying to the client a value for the one attribute received from the second source.

60. (Original) A method in a portable computer for providing information about a context that is modeled with multiple context attributes, comprising:

receiving from each of multiple sources an indication of a current ability to supply values for at least one of the context attributes of the context;

receiving from at least one source an indication of a current inability to supply values for at least one of the context attributes of the context; and

after a request from a client for a value of a specified attribute,

determining based on the received indications if any sources are currently available to supply values for the specified attribute;

when at least one source is determined to be currently available, retrieving a value for the specified attribute that is supplied by at least one of the determined sources; and

sending to the client the retrieved value.

61. (Original) The method of claim 60 wherein the context attributes represent information about a user of the portable computer.

62. (Original) The method of claim 60 wherein the context attributes represent information about a physical environment of the portable computer.

63. (Original) The method of claim 60 wherein the context that is represented is a current context.

64. (Original) The method of claim 60 including:
after the determining if any sources are currently available to supply values for the specified attribute, when it is determined that no sources are currently available, indicating to the client that the requested value is not available.
65. (Original) The method of claim 60 wherein the providing of the information about the context is performed by a first intermediary module, and including:
receiving from a second intermediary module an indication of a desire to perform the providing of the information about the context; and
in response to the received indication from the second intermediary module, transferring control of the providing of the information about the context to the second intermediary module.
66. (Original) The method of claim 60 wherein the received indications from the multiple sources of the current ability to supply values for context attributes are registration messages.
67. (Original) The method of claim 60 including:
for each received indication of a current ability to supply values for at least one of the context attributes of the context, establishing continuing communications with the source from whom the indication was received; and
for each received indication of a current inability to supply values for at least one of the context attributes of the context, suspending any previously established continuing communications with the source from whom the indication was received.
68. (Original) The method of claim 67 wherein the sending of the retrieved value to the client is in response to receiving values for the specified attribute from at least one of the determined sources.
69. (Original) The method of claim 60 wherein the sending of the retrieved value to the client is in response to receiving of the request.

70. (Original) The method of claim 69 including:
in response to the request,
 sending requests to at least some of the determined sources for a value of the specified attribute; and
 receiving at least one value for the specified attribute from the determined sources in response to the sent requests.

71. (Original) The method of claim 60 wherein receiving of the sent value by the client prompts the client to present information to a user of the client.

72. (Original) The method of claim 60 including, after receiving a request from a second client for a value of another attribute, sending to the second client a value for the another attribute.

73. (Original) The method of claim 60 wherein the retrieved value is a value supplied by a first of the determined sources, and including:
 after the sending to the client of the retrieved value, receiving from the first determined source an indication of a current inability to supply values for the specified attribute; and
 after a second request from the client for a value of the specified attribute, sending to the client a value that is supplied by another of the sources.

74. (Original) The method of claim 60 wherein the retrieved value is a value supplied by a first of the determined sources, and including:
 after the sending to the client of the retrieved value, receiving from another source an indication of a current ability to supply values for the specified attribute; and
 after a second request from the client for a value of the specified attribute, sending to the client a value that is supplied by the another source.

75. (Currently Amended) A computer-readable medium containing instructions that when executed cause a computing device to provide information about a context that is modeled with multiple context attributes, by performing a method comprising:

receiving from each of multiple sources an indication of a current ability to supply values for at least one of the context attributes of the context;

receiving from at least one source an indication of a current inability to supply values for at least one of the context attributes of the context; and

after a request from a client for a value of a specified attribute,

determining based on the received indications if any sources are currently available to supply values for the specified attribute;

when at least one source is determined to be currently available, retrieving a value for the specified attribute that is supplied by at least one of the determined sources; and

sending to the client the retrieved value.

76. (Original) A portable computer for providing information about a context that is represented with multiple attributes, comprising:

an attribute mapping module that is capable of receiving from each of multiple sources an indication of a current ability to supply values for at least one of the attributes of the context and that is capable of receiving from at least one source an indication of a current inability to supply values for at least one of the attributes of the context; and

an attribute value supplier module that is capable of, after a request from a client for a value of a specified attribute, determining based on the received indications if any sources are currently available to supply values for the specified attribute, determining a value for the specified attribute that is based on at least one value supplied by at least one source determined to be currently available, and sending to the client the determined value.

77. (Original) A computer-implemented method for providing information about a current state that is modeled with multiple state attributes, at least some of the state attributes having multiple sources available to supply values for the attribute, comprising:

sending to an intermediary module an indication of one of the state attributes;

receiving from the intermediary module a first value for the indicated state attribute that was supplied from a first source, the first source being an only source currently available to supply values for the indicated state attribute at the time of the receiving of the first value;

after the receiving of the first value, receiving from the intermediary module a second value for the indicated state attribute that was based on values for the indicated state attribute supplied from the first source and from a second source, the first and second sources both available to supply values for the indicated state attribute at the time of the receiving of the second value;

after the receiving of the second value, receiving from the intermediary module a third value for the indicated state attribute that was supplied from the second source, the second source being an only source currently available to supply values for the indicated state attribute at the time of the receiving of the third value; and

using at least one of the received values to perform processing based on the modeled current state.

78. (Original) The method of claim 77 wherein the processing includes generating a value for another of the state attributes based at least in part on one or more of the received values and sending an indication of the generated value to the intermediary module.

79. (Original) The method of claim 77 wherein the processing based on at least one of the received values includes presenting information to a user.

80. (Original) The method of claim 77 wherein the sent indication indicates an interest in receiving values for the indicated state attribute, and wherein each of the received values is sent by the intermediary module in response to the intermediary module receiving at least one value for the indicated state attribute from at least one source.

81. (Original) The method of claim 77 wherein the sent indication is a request for a value for the indicated state attribute, wherein the received first value is sent by the intermediary module in response to receiving the request, and including sending second and third requests to

the intermediary module such that the second and third values are received in response to the sent second and third requests.

82. (Original) The method of claim 77 wherein security information for a source must be received before any state attributes values are accepted from the source.

83. (Currently Amended) A computer-readable medium whose contents cause a computing device to provide information about a current state that is modeled with multiple state attributes, at least some of the state attributes having multiple sources available to supply values for the attribute, by performing a method comprising:

sending to an intermediary module an indication of one of the state attributes;

receiving from the intermediary module a first value for the indicated state attribute that was supplied from a first source, the first source being an only source currently available to supply values for the indicated state attribute at the time of the receiving of the first value;

after the receiving of the first value, receiving from the intermediary module a second value for the indicated state attribute that was based on values for the indicated state attribute supplied from the first source and from a second source, the first and second sources both available to supply values for the indicated state attribute at the time of the receiving of the second value; and

after the receiving of the second value, receiving from the intermediary module a third value for the indicated state attribute that was supplied from the second source, the second source being an only source currently available to supply values for the indicated state attribute at the time of the receiving of the third value.

84. (Original) A computing device for providing information about a current state that is modeled with multiple state attributes, at least some of the state attributes having multiple sources available to supply values for the attribute, comprising:

a first module capable of sending to an intermediary module an indication of one of the state attributes; and

a second module capable of receiving from the intermediary module a first value for the indicated state attribute that was supplied from a first source, the first source being an only

source currently available to supply values for the indicated state attribute at the time of the receiving of the first value, of receiving from the intermediary module a second value for the indicated state attribute that was based on values for the indicated state attribute supplied from the first source and from a second source, the first and second sources both available to supply values for the indicated state attribute at the time of the receiving of the second value, and of receiving from the intermediary module a third value for the indicated state attribute that was supplied from the second source, the second source being an only source currently available to supply values for the indicated state attribute at the time of the receiving of the third value.

85. (Original) A computer-implemented method for providing information about a current state that is modeled with multiple state attributes, each of the state attributes having multiple sources available to supply values for the attribute, comprising:

- sending to an intermediary module a registration message indicating an ability to supply values for an indicated one of the state attributes of the modeled current state;

- receiving input information about the modeled current state;

- generating a value for the indicated state attribute based at least in part on the received input information;

- receiving from the intermediary module a request for a value of the indicated state attribute, the request sent by the intermediary module based on the indicated current ability to supply values for the indicated state attribute;

- sending to the intermediary module an indication of the generated value so that the intermediary module can supply to a client a value for the indicated state attribute based at least in part on the generated value; and

- after the sending of the indication of the generated value, sending to the intermediary module an unregistration message indicating an inability to supply values for the indicated state attribute so that the intermediary module will refrain from sending requests for values for the indicated state attribute, the refraining based on the current inability to supply values for the indicated state attribute as indicated to the intermediary module in the sent unregistration message.

86. (Original) The method of claim 85 including generating an uncertainty value associated with accuracy of the generated value, and wherein the sending of the indication of the generated value includes an indication of the generated uncertainty value.

87. (Original) The method of claim 85 including determining an effective time at which the generated value is most accurate, and wherein the sending of the indication of the generated value includes an indication of the determined effective time.

88. (Original) The method of claim 85 wherein the received indication indicates an interest in receiving values for the indicated state attribute, and wherein the sending of the generated value to the intermediary module is in response to the receiving of the input information.

89. (Original) The method of claim 85 wherein the received indication is a request for a value for the indicated state attribute, and wherein the sending of the generated value to the intermediary module is in response to the receiving of the request.

90. (Original) The method of claim 85 wherein the input information is received from a sensor.

91. (Original) The method of claim 85 wherein the sending of the registration message is based on a current ability to receive the input information about the modeled current state, and wherein the sending of the unregistration message is based on a current inability to receive the input information about the modeled current state.

92. (Original) The method of claim 85 wherein security information for the intermediary module must be received before any state attributes values are sent to the intermediary module.

93. (Currently Amended) A computer-readable medium whose contents cause a computing device to provide information about a current state that is modeled with multiple state

attributes, each of the state attributes having multiple sources available to supply values for the attribute, by performing a method comprising:

- sending to an intermediary module a registration message indicating an ability to supply values for an indicated one of the state attributes of the modeled current state;

- receiving input information about the modeled current state;

- generating a value for the indicated state attribute based at least in part on the received input information;

- receiving from the intermediary module an indication of the indicated state attribute, the indication sent by the intermediary module based on the indicated current ability to supply values for the indicated state attribute;

- sending to the intermediary module an indication of the generated value so that the intermediary module can supply to a client a value for the indicated state attribute based at least in part on the generated value; and

- after the sending of the indication of the generated value, sending to the intermediary module an unregistration message indicating an inability to supply values for the indicated state attribute so that the intermediary module will refrain from sending indications of the indicated state attribute, the refraining based on the current inability to supply values for the indicated state attribute as indicated to the intermediary module in the sent unregistration message.

94. (Original) A computer system for providing information about a current state that is modeled with multiple state attributes, each of the state attributes having multiple sources available to supply values for the attribute, comprising:

- a first module capable of sending to an intermediary module a registration message indicating an ability to supply values for an indicated one of the state attributes of the modeled current state;

- a second module capable of receiving input information about the modeled current state and of generating a value for the indicated state attribute based at least in part on the received input information; and

- a third module capable of receiving from the intermediary module an indication of the indicated state attribute, the indication sent by the intermediary module based on the indicated current ability to supply values for the indicated state attribute, and of sending to the intermediary module an indication of the generated value so that the intermediary module can

supply to a client a value for the indicated state attribute based at least in part on the generated value,

wherein the first module is capable of, after the sending of the indication of the generated value by the third module, sending to the intermediary module an unregistration message indicating an inability to supply values for the indicated state attribute so that the intermediary module will refrain from sending indications of the indicated state attribute, the refraining based on the current inability to supply values for the indicated state attribute as indicated to the intermediary module in the sent unregistration message.